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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/997,142	11/29/2001	Xiaoliu Liu	01-733	3417

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EXAMINER

EDGAR, RICHARD A

ART UNIT	PAPER NUMBER
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3745

DATE MAILED: 04/24/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/997,142

Applicant(s)

LIU, XIAOLIU

Examiner

Richard Edgar

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-9 is/are rejected.
- 7) ☒ Claim(s) 5 and 10 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 and 3. 6) ☐ Other: .

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the oil scoop disposed on the periphery of the bearing chamber, as recited in claims 5 and 10 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,142,729 issued to Tran et al. in view of United States Patent No. 5,415,478 issued to Matthews et al.

Tran et al. disclose a method and apparatus of minimizing oil consumption in a gas turbine engine (col. 1, lines 12-16), by avoiding reliance on air intake into the engine oil circuit for bearing chamber oil sealing purposes, the engine having an oil circuit (see col. 2, lines 45-49) including: at least one bearing 3 supporting at least one engine shaft 1 at a support point along a shaft axis; at least one bearing chamber 5 enveloping each said bearing 3 and maintaining a volume of oil with an oil-air interface (col. 1, lines 43-44) in communication with a volume of air therein 6; wherein the method comprises: sealing each bearing chamber 5 with a hydropad seal disposed in sealing relation between the shaft 1 and bearing chamber 5, the hydropad seal comprising an annular ring 8 mounted to the shaft 1 and an annular pad 7 mounted to the chamber 5, the ring 8 and the pad 7 having abutting seal surfaces; rotating the ring 8 during engine operation to cast oil radially outwardly from the shaft axis toward an outer periphery of the bearing chamber 5 under a centrifugal force.

The oil circulation operates independently of an oil-air separation function and an air venting function.

The abutting sealing surfaces of the hydropad remain engaged in frictional sealing relation below a lift off rotary speed. The abutting sealing surfaces of the hydropad disengage when rotary speed exceeds the lift off rotary speed, the ring

sealing surface casting oil outwardly under centrifugal force to impede oil passage through the hydropad seal (see col. 3, lines 5-12).

Tran et al. recite, "the lubrication being provided in manner known per se and not being shown in detail in the drawings" (col. 2, lines 45-49). Therefore, Tran et al. do not expressly show an oil circuit comprising: oil circulation means in flow communication with each bearing chamber 5 for supplying a flow of oil to a bearing chamber inlet and for evacuating spent oil from an outlet of the bearing chamber; a means for collecting oil from the outer periphery of the bearing chamber 5 and directing oil flow to the bearing chamber outlet.

Matthews et al. show a typical gas turbine engine bearing chamber 34 in Fig. 1 comprising an inlet 76 for oil to enter the oil cavity 44, and a port (not shown) for oil to exit the cavity (see col. 3, lines 19-21), wherein under centrifugal force, oil is collected and directed to the outlet for the purpose of circulating the oil in the bearing chamber.

Since Tran et al. suggest using the hydropad seal in a typical lubrication circuit and Matthews et al. show a typical lubrication circuit in a gas turbine engine, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to include the oil chamber inlet and outlet ports of Matthews et al. into the hydropad seal teachings of Tran et al. for the purpose of circulating the oil in the bearing chamber.

Claims 1-4 and 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent No. 5,941,532 issued to Flaherty et al. in view of United States Patent No. 5,415,478 issued to Matthews et al.

Flaherty et al. disclose a method and apparatus of minimizing oil consumption in a gas turbine engine, by avoiding reliance on air intake into the engine oil circuit for chamber oil sealing purposes by maintaining a volume of oil 42 with an oil-air interface in communication with a volume of air therein 44; wherein the method comprises: sealing each chamber with a hydropad seal 26 disposed in sealing relation between the shaft 20 and chamber 22, the hydropad seal comprising an annular ring 28 mounted to the shaft and an annular pad 30 mounted to the chamber, the ring 28 and the pad 30 having abutting seal surfaces; rotating the ring during engine operation to cast oil radially outwardly from the shaft axis toward an outer periphery of the bearing chamber under a centrifugal force.

The oil circulation operates independently of an oil-air separation function and an air venting function.

The abutting sealing surfaces of the hydropad 26 remain engaged in frictional sealing relation below a lift off rotary speed (col. 3, lines 37-39). The abutting sealing surfaces of the hydropad disengage when rotary speed exceeds the lift off rotary speed (col. 3, lines 50-61), the ring sealing surface casting oil outwardly under centrifugal force to impede oil passage through the hydropad seal.

Flaherty et al. teach an oil-air interface seal between rotating and stationary components of a gas turbine engine. Flaherty et al. list many applications in which their

invention may be realized, such as main shafts of a gas turbine engine (col. 3, lines 8-9). Flaherty et al. do not explicitly disclose the details of the main shaft application.

Matthews et al. show a typical gas turbine engine bearing chamber 34 in Fig. 1 comprising an inlet 76 for oil to enter the oil cavity 44, and a port (not shown) for oil to exit the cavity (see col. 3, lines 19-21), wherein under centrifugal force, oil is collected and directed to the outlet for the purpose of circulating the oil in the bearing chamber.

Since Flaherty et al. suggest using the hydropad seal in an oil-air interface and Matthews et al. show a typical lubrication circuit in a gas turbine engine comprising an oil-air interface, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to include the oil chamber inlet and outlet ports of Matthews et al. into the hydropad seal teachings of Flaherty et al. for the purpose of circulating the oil in the bearing chamber.

Allowable Subject Matter

Claims 5 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Matthews et al. (U.S. 5,415,478) show oil circulation in a bearing chamber having an oil scoop 84 used to deliver oil to the roller bearings by means of a passageway in the inner bearing race (see col. 3, lines 26-28). As can be seen in Fig. 1, the oil scoop is on the inner periphery of the bearing chamber. Therefore, in the examiner's opinion, it would not have been obvious at the time the invention was made

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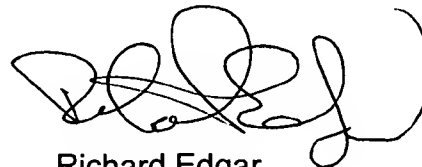
to a person having ordinary skill in the art to further modify the inventions of either Tran et al. in view of Matthews et al. or Flaherty et al. in view of Matthews et al. to also include an oil scoop disposed on the outer periphery of the bearing chamber for collecting cast oil, especially since Matthews et al. teach an oil scoop on the inner periphery which directs oil to the bearing, not away from the bearing as is recited in claims 5 and 10.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Edgar whose telephone number is (703) 305-0050. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30-5:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (703) 308-1044. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.



Richard Edgar
Examiner
Art Unit 3745

RE
April 21, 2003



EDWARD K. LOOK
SUPERVISORY PATENT EXAMINER
GROUP 3700
4/21/03